

**Age and Growth of *Varicorhinus trutta*
(Heckel)
in Tigris River at Salahudin Province, Iraq**

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Abstract

Age and growth of a population of *Varicorhinus trutta* (Heckel) from Tigris river at Salahudin province have been investigated during the period from September 1999 to August 2000. A total of 156 fishes were collected from two stations at Tigris river using small meshed gill nets.

The age data revealed that the species under investigation reached to a maximum age of seven years and approximately 46 cm long. The population of this species in Tigris river at the sites of study was dominated by 3 and 4 years classes. There were no marked differences in growth or longevity between the sexes. Determination of length-weight relationship revealed that the growth of both sexes in the species under investigation was allometric and the values of both sexes showed that there were clear relationships between the maturity stage and condition factor values as the highest values appeared during the breeding season months (March till July).

Introduction

In 1995, a large scale investigation was commenced in Biology Department, College of Education Ibn Al-Haitham, University of Baghdad to investigate the biological characteristics of several fish species from different sites at Tigris river in an attempt to explain the poor catches of different Iraqi inland water fish species. The present paper reports part of an extensive study which has been carried out to explain the different biological aspects viz. age, growth, breeding, food and feeding habits, etc. of *Varicorhinus trutta* (Heckel).

One of the major drawbacks with the current investigation was the almost complete lack of scientific data about the age and growth of *V.*

trutta prior to 1995 with the exception of the preliminary data reported by Dauod (1).

Study Area

The sites of study situated within Salahuddin province area, mid of Iraq. The first site of study was at Albu Tuaama village, about 30 km north of Tikreet city and the second site was at Al-Muhzam region, about 15 km north of Tikreet city. Two sites at the right bank of the river were selected to collect fish samples Fig. (1).

Several fish species occur in Tigris river at the area of study. The most abundant species are *Liza abu* (Heckel), *Barbus grypus* Heckel, *B. xantho-pterus* (Heckel), *Cyprinus carpio* L., *Varicorhinus damascinus* (Val.), in addition to the species under investigation.

Materials and Methods

Fishes were collected during the period from September 1999 till August 2000 from two stations at the right bank of Tigris river, north of Tikreet city using small meshed gill nets (2.5× 2.5 and 3.5× 3.5 cm.).

The specimens were measured using total length viz., from the tip of the snout to the end of caudal fin. The total weight was also taken. The numbers measured, aged and sexed are listed in Table (1). Scales were used to determine the age and growth of fishes.

Results and Discussion

Age Groups: The result of the present study indicated that there were six age groups (I-VI) for both males and females. Group 0 was not represented in all samples during the period of investigation which may be related to the fact that gill nets missed the small fishes as they were able to pass through the nets (2, 3).

Table (2) illustrated the mean total length per age class and their ranges in the sites of study. It can be seen that groups III and IV were the dominant age groups of both males and females. This result confirmed the results recorded by Dauod (1), who worked on the same species from Tigris river at Mosul city.

Growth in Length: Total length at the time of annulus formation was back calculated from the scales. The mean calculated lengths for various years of life of different year classes along with the mean annual increment in the two sites are illustrated in Table (2).

Fig.(2) showed the growth in length for each year of life and the annual increment for male and female fishes. It seems from the above table and figure that the growth during the second and third years was rapid but then dropped off during the fourth year of age onwards. It is important to note that there is no scientific data about the age and growth of *V. trutta* except the data reported by Dauod (1), who determined the age by the method of length frequency distribution. This method did not deal with growth rate of fishes. Dauod *et al.* (4) recorded similar results in *Varicorhinus damascinus* (Val.) at the same sites. This probably supported the results of the present study due to the evolutionary facts, especially when taken in consideration that both species live under the same environmental conditions.

Growth in Weight: The growth in weight of *V. trutta* was obtained from the actual mean total weight at each year of life and by converting lengths of back calculations for each year of life using length- weight equation. The actual mean weight attained at each year of life is shown in Table (2).

Fig. (3) showed that the annual growth rate in weight of *V. trutta* decreased with increasing age. The highest increment in weight was occurred during the fourth year of age. Such results confirmed the results obtained by Al-Ibady (5) and Dauod *et al.* (4). Generally, the previous studies concerned with the age and growth of different fish species suggested several factors affecting the growth rate such as availability of food, chemistry of water, fluctuations of water level etc. (6, 7, 8, 9).

Total Length- Weight Relationship: The relationship between fish total length (L) and body total weight (W) of males and females were calculated and demonstrated in the following straight line logarithmic formula:

$$\text{Log } W = 1.4904 + 2.5885 \log L \quad \text{for males}$$

$$r = 0.94 \quad (P > 0.05)$$

$$\text{Log } W = 1.5723 + 2.6877 \text{ Log } L \quad \text{for females}$$

$$r = 0.84 \quad (P > 0.05)$$

Values of the regression coefficient (b) indicated that the growth of both sexes of *V. trutta* was allometric. Figures (4 and 5) illustrated the length- weight relationship in male and female fishes separately.

In the literature, several factors have been reported to affect either positively or negatively the b value. Such factors include gear selectivity, gonad maturity, sex, season of the year and stomach

fullness (1, 7, 10, 11). The results of the present study recorded some differences in b value of males and females, which may be related to the gear selectively. This result confirmed the result reported by Dauod (1) who worked on *V. trutta* from Tigris river at Mosul city, north of Iraq.

Condition factor: The condition factor or “ponderal index” was determined by the formula:

$$K = W \times 100 / L^3$$

Monthly changes of “K” values are shown in fig. (6). It is clear from that figure that the highest values were recorded during the period from March till July which represents the breeding season months (6, 7).

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Table (1) Number of *V. trutta* caught, aged and sexed on each sampling month.

Month	Sample size	Number aged	Number sexed
September 1999	19	18	18
October	11	11	11
November	7	7	7
December	10	10	10
January 2000	12	11	11
February	12	12	12
March	17	17	17
April	20	20	20
May	14	14	14
June	15	14	14
July	9	9	9
August	10	9	9
Total	156	152	152

Table (2) Mean (underlined> and ranges of length (cm) at each growth period of V. trutta (upper rows for males and lower rows for females)

Age group	Number of fishes	Observed total length	Length at age classes																				
			1	2	3	4	5	6	7														
I	3	12.33	4.5	6.33	8.5	8	10.0	13.5															
	2	12.5	5	6.5	8	7.5	9.5	12															
II	14	17.0	4.0	5.5	7.5	7	11.0	12.5	12	17	19												
	8	18.25	5	6.5	8.5	8	11.5	13	12.5	18	20												
III	34	24.25	4.5	6.25	8	7	10.5	12	11.5	17.5	19.5	17.5	23.5	17									
	25	24.66	4.0	6.0	9	7.5	11.0	13	12.5	18.5	20.5	18	24.5	28									
IV	26	31.0	5	6.25	8.5	7	10.5	12.5	12	17.5	19.5	18	24.2	26.5	23	26.5	29.5						
	19	31.25	5	6.5	8	8	10.0	13.5	12.5	18	21	17.5	23.5	26	24	28	30.5						
V	12	38.5	4.5	6.0	8.5	7	9.5	13	11.5	17.5	20.5	18	23	25	25	29	32	29.5	33.5	37			
	8	39.75	5	6.25	7.5	8	10.0	13.0	12	18	21	18.5	23.5	26	25.5	29.5	33	30	34	38.5			
VI	3	41.5	5	6.66	7.5	7.5	10.5	13	12.5	17.83	21	18	21.17	26.5	23	28.33	32	27.5	31	34	38	45.5	
	2	43.25	4.5	6.25	8	7.5	11.17	13.5	13	16.75	20.5	18.5	22.25	26	23	27.5	31	27.5	32	36.5	34.5	40.25	46
Mean total length (cm)			6.165	6.333	10.333	17.416	22.980	27.943	32.415	38.000													
Increment of mean total length (cm)			6.165	4.168	10.528	7.083	5.564	4.963	28.330	4.472	4.920	5.585	7.000	122.230	125.220	17.090	11.520	17.090	11.520	17.090	11.520	17.090	11.520
Mean total weight (gm)			18.160	29.880	48.480	50.460	18.600	25.160	18.540	19.910	18.540	19.910	18.540	19.910	18.540	19.910	18.540	19.910	18.540	19.910	18.540	19.910	18.540
Increment of mean total weight (gm)			18.160	11.720	12.150	18.600	25.160	18.540	19.910	18.540	19.910	18.540	19.910	18.540	19.910	18.540	19.910	18.540	19.910	18.540	19.910	18.540	19.910

Age group I: fishes at 2nd year of age.
 II: fishes at 3rd year of age.
 VI: fishes at 7th year of age.

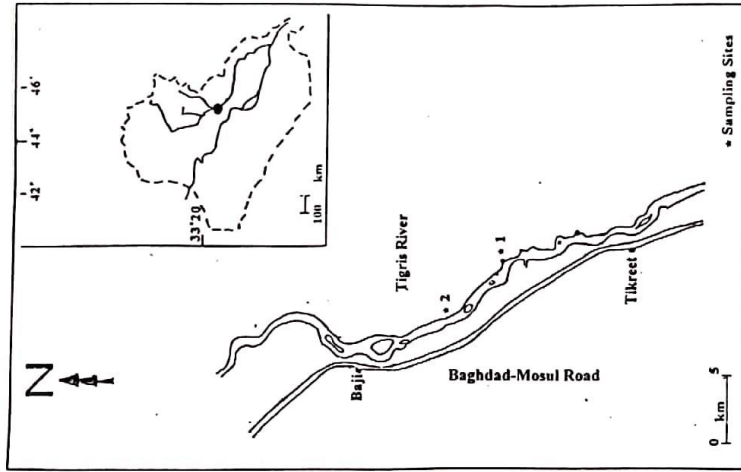


Fig. (1) Location of study area indicating the sampling sites.

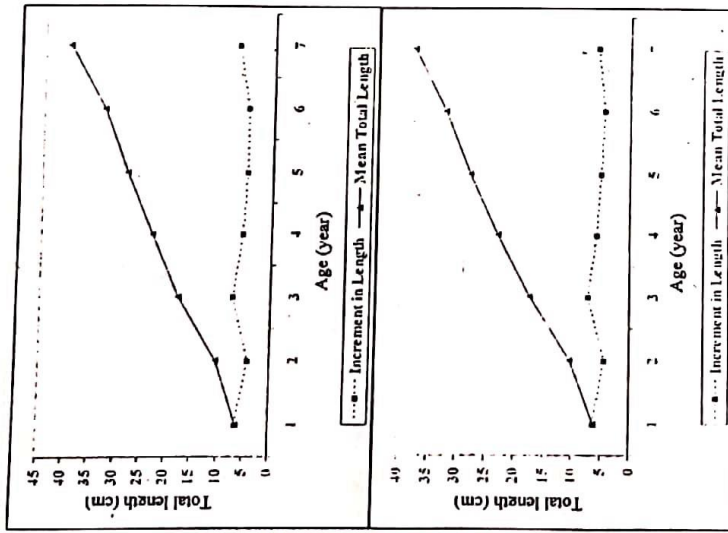


Fig. (2) The average growth and annual increment in length of males (upper) and females (lower) of *V. trutta*

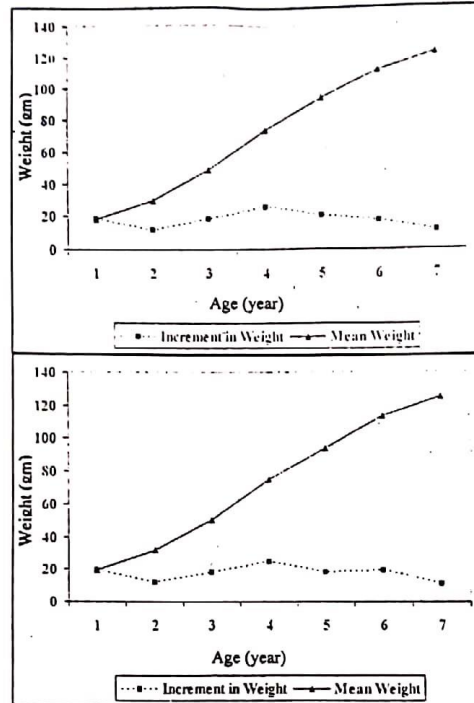


Fig. (3) The average growth and annual increment in weight of males (upper) and females (lower) of *V. trutta*.

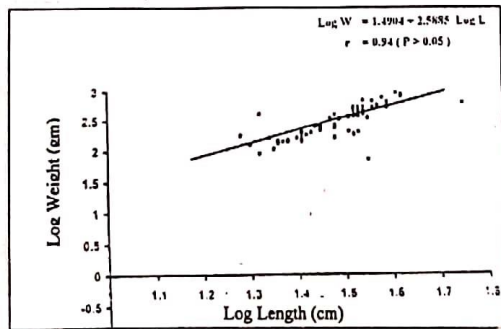


Fig. (4) Logarithmic length- weight relationship of males of *V. trutta*.

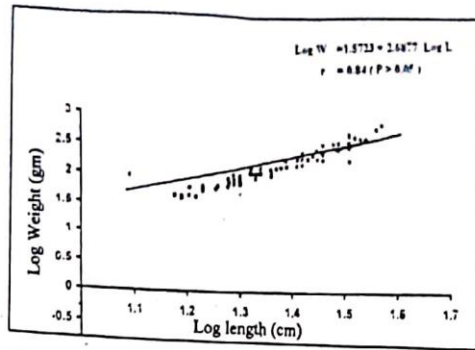


Fig.(5) Logarithmic length- weight relationship of females of *V. trutta*.

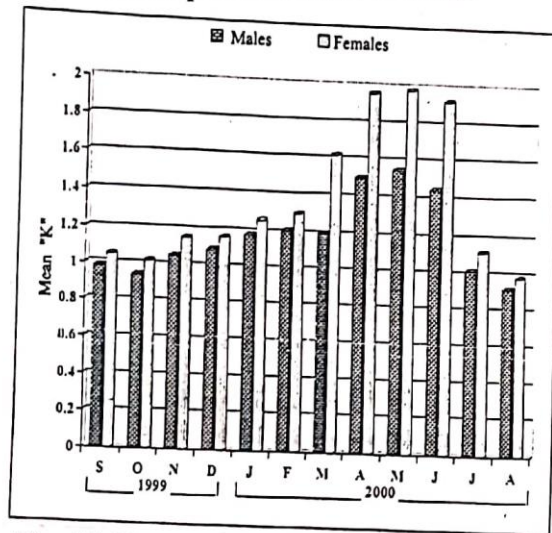


Fig. (6) Monthly changes in condition factor of *V. trutta*.

العمر والنمو في سمكة التيلة المرقطة
Varicorhinus trutta (Heckel)
في نهر دجلة عند محافظة صلاح الدين، العراق

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المستخلص

تم دراسة العمر والنمو لمجموعة التيلة المرقطة *Varicorhinus trutta* (Heckel) في نهر دجلة عند محافظة صلاح الدين خلال المدة من أيلول (سبتمبر) 1999 إلى آب (أغسطس) 2000. تم جمع ما مجموعه 156 سمكة من محطتين على نهر دجلة باستخدام شباك خيشومية صغيرة الفتحات. أوضحت نتائج دراسة العمر أن النوع موضوع الدراسة يصل أقصى ما يصل إليه هو عمر سبع سنوات وعندها يصل الطول 46 سم تقريباً. كانت الأعمار السائدة للمجموعة السكانية لهذا النوع ضمن موقعي الدراسة 3 و 4 سنوات. ولم تؤشر إختلافات واضحة بين الجنسين (الذكر والأنثى) بخصوص النمو والعمر. أوضح حساب العلاقة بين الطول الكلي والوزن أن النمو في كلا جنسي السمكة ليس قياسياً وأن هناك علاقة واضحة بين النضج الجنسي ومعامل الحالة حيث سجلت أعلى القيم خلال أشهر فصل التكاثر (آذار ولغاية تموز).